

What is the water cycle?

The water cycle describes the existence and movement of water on, in, and above the Earth. Earth's water is always in movement and is always changing states, from liquid to vapor to ice and back again.

Precipitation

Precipitation is water released from clouds in the form of rain, freezing rain, sleet, snow, or hail. It is the primary connection in the water cycle that provides for the delivery of atmospheric water to the Earth. Most precipitation falls as rain.



Infiltration

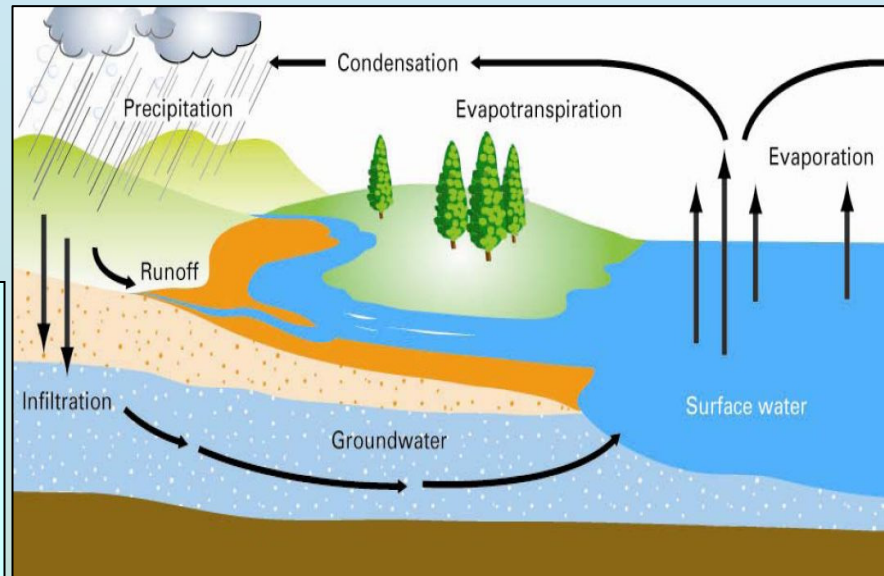
Anywhere in the world, a portion of the water that falls as rain and snow infiltrates into the subsurface soil and rock. How much infiltrates depends greatly on a number of factors, such as ground cover or soil type.

Some water that infiltrates will remain in the shallow soil layer, where it will gradually move vertically and horizontally through the soil and subsurface material. Eventually, it might enter a stream by seepage into the stream bank.

Some of the water may infiltrate deeper, recharging ground-water aquifers. If the aquifers are porous enough to allow water to move freely through it, people can drill wells into the aquifer and use the water for their purposes. Water may travel long distances or remain in ground-water storage for long periods before returning to the surface or seeping into other water bodies, such as streams and the oceans.

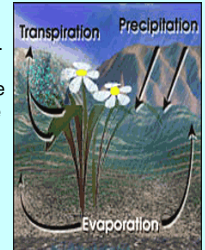
Runoff

When rain hits saturated or impervious ground it begins to flow overland downhill. It is easy to see if it flows down your driveway to the curb and into a storm sewer, but it is harder to notice it flowing overland in a natural setting. During a heavy rain you might notice small rivulets of water flowing downhill. Water will flow along channels as it moves into larger creeks, streams, and rivers.



Evapotranspiration

In general, evapotranspiration is the sum of evaporation and transpiration. Evapotranspiration is defined as the water lost to the atmosphere from the ground surface, evaporation from the capillary fringe of the groundwater table, and the transpiration of groundwater by plants whose roots tap the capillary fringe of the groundwater table.



The transpiration aspect of evapotranspiration is essentially evaporation of water from plant leaves. Transpiration accounts for about 10 percent of the moisture in the atmosphere, with oceans, seas, and other bodies of water (lakes, rivers, streams) providing nearly 90 percent, and a tiny amount coming from sublimation (ice changing into water vapor without first becoming liquid).

Evaporation

Evaporation is the process by which water changes from a liquid to a gas or vapor. Evaporation is the primary pathway that water moves from the liquid state back into the water cycle as atmospheric water vapor.

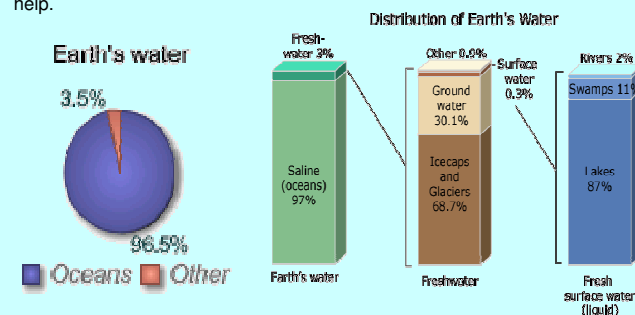


Studies have shown that the oceans, seas, lakes, and rivers provide nearly 90 percent of the moisture in the atmosphere via evaporation, with the remaining 10 percent being contributed by plant transpiration.

A very small amount of water vapor enters the atmosphere through sublimation, the process by which water changes from a solid (ice or snow) to a gas, bypassing the liquid phase. Sublimation is a common way for snow to disappear quickly in arid climates.

Storage

As a part of the water cycle, Earth's surface-water bodies are generally thought of as renewable resources, although they are very dependent on other parts of the water cycle. The amount of water in our rivers and lakes is always changing due to inflows and outflows. Inflows to these water bodies will be from precipitation, overland runoff, ground-water seepage, and tributary inflows. Outflows from lakes and rivers include evaporation and discharge to ground water. Humans get into the act also, as people make great use of surface water for their needs. So, the amount and location of surface water changes over time and space, whether naturally or with human help.



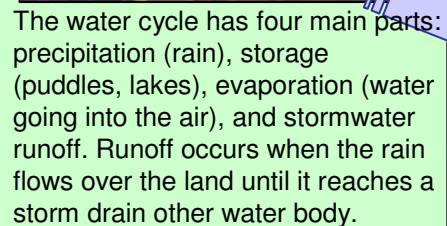
Condensation

Condensation is the process in which water vapor in the air is changed into liquid water. Condensation is responsible for the formation of clouds. These clouds may produce precipitation, which is the primary route for water to return to the Earth's surface.

Condensation is responsible for your glasses fogging up when you go from a cold room to the outdoors on a hot, humid day, for the water that drips off the outside of your glass of soda, and for the water on the bathroom mirror after you take a shower.

know where
it goes

take simple
steps to reduce
STORMWATER POLLUTION



When rain falls on impervious surfaces, such as streets, it travels across the surface and down the gutters and enters storm drains, or catch basins.

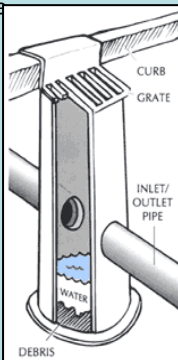


From the catch basin, the water enters a pipe. Catch basins are connected to each other by these pipes. The runoff travels down the pipes by gravity, flowing to the lowest point in the system, where the water exits the system.

The point where the runoff leaves the storm drain system is called the "outfall." Unlike sewer systems, which carry wastewater to sewage treatment plants, the storm drain system releases untreated water directly into wetlands, streams and the ocean.

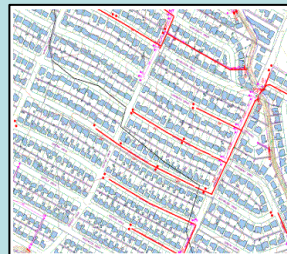


Catch basins are often the first step in stormwater treatment. They trap debris such as sand and gravel. The area below the pipe inlet/outlet is called the "sump". The sump allows for some contaminants to settle to the bottom of the catch basin, making the catch basin one method of treating polluted runoff.



The catch basins are vacuumed out periodically by large vacuum trucks.

Catch basins are connected by pipes to other catch basins, picking up water from each basin as it travels through the system.



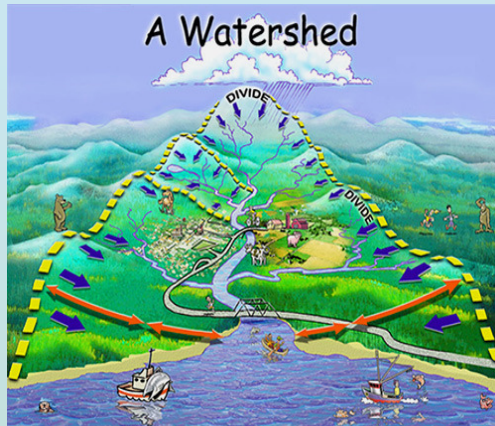
Pipes for storm drain systems can be made of different materials. The most common materials are corrugated metal, PVC, and concrete. Pipes also come in many sizes, depending on the flow. Generally, the pipes are small at the beginning of the system, and gradually get bigger towards the outfall.



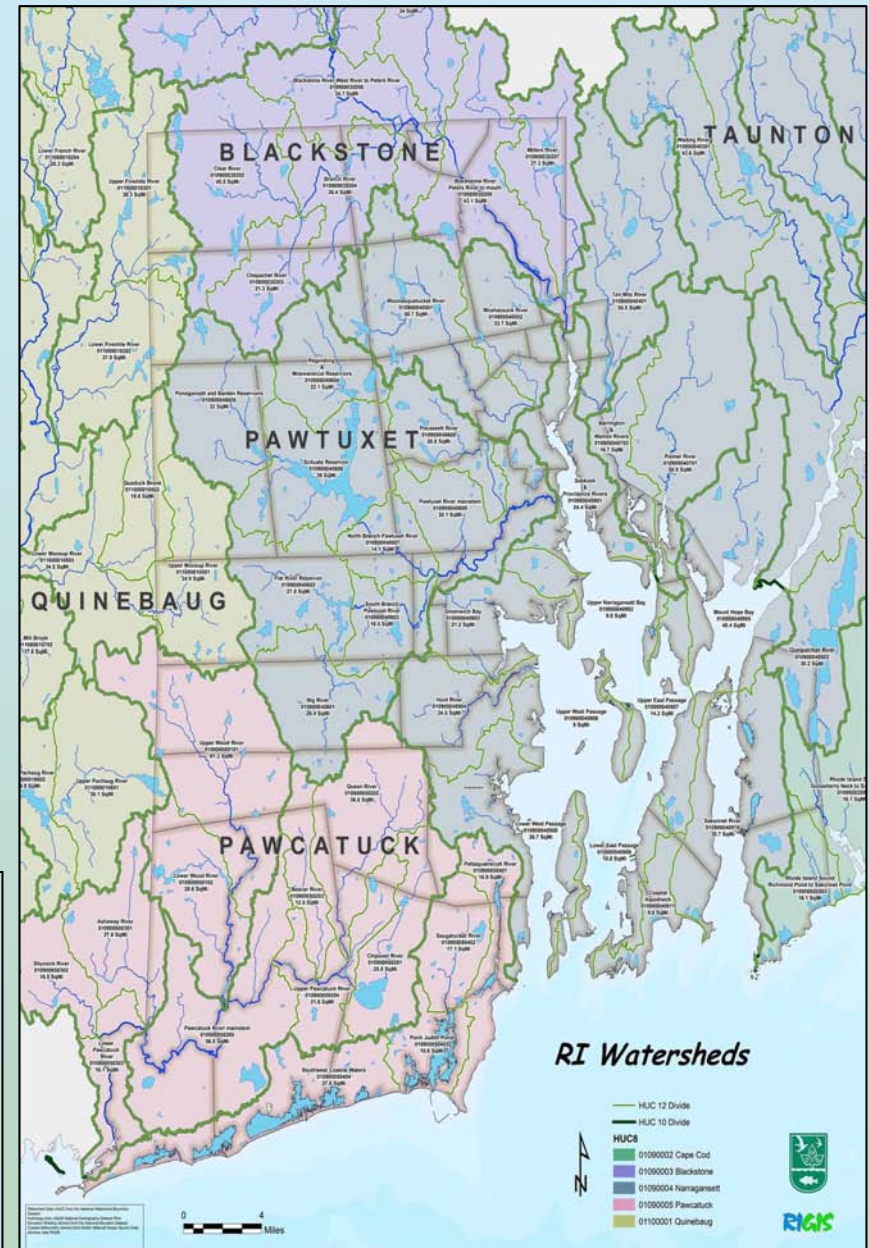
Rhode Island Watersheds

What is a Watershed?

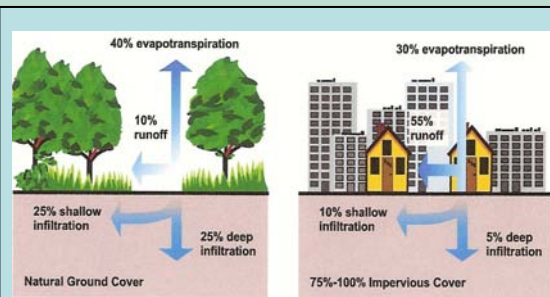
A watershed, or drainage basin, is the area of land and all waterways that drains into a particular body of water. All rainfall and melting snow travel to the nearest waterbody that lies at the lowest point of a watershed.



Watersheds come in all shapes and sizes. They can be as small as a footprint or large enough to encompass multiple states. Everyone lives in a watershed, and most are interconnected, eventually draining to the ultimate water bodies – the bays or oceans. There are about 14 different watersheds in Rhode Island, each named for the body of water that they drain into (i.e. Hunt River Watershed).



The Mississippi River watershed encompasses 2/3 of the United States. Stormwater runoff from this watershed is so extensive that a large dead zone (hypoxic zone) forms where the river drains into the Gulf of Mexico. The dead zone is so low in oxygen, that it cannot support life.



When a watershed becomes developed, the water cycle in that area is altered. With more impervious cover (hard surfaces that don't allow water to soak through), comes an increase in runoff and pollutant loading.